



ARMY VISION FOR NET ZERO

NET ZERO IS A FORCE MULTIPLIER



Striving for net zero is operationally necessary, financially prudent, and critical to our mission.

--Honorable Katherine Hammack, DoD Press Release, 20 April 2011



The Army's vision is to appropriately manage our natural resources with a goal of Net Zero Installations. Today the Army faces significant threats to our energy and water supply requirements both home and abroad. Addressing energy security and sustainability is operationally necessary, financially prudent, and mission essential. The goal is to manage our installations not only on a Net Zero Energy basis, but Net Zero Water and Waste as well. We are creating a culture that recognizes the value of sustainability measured not just in terms of financial benefits, but benefits to maintaining mission capability, quality of life, relationships with local communities, and the preservation of options for the Army's future. The Army is leveraging available authorities for private sector investment, including using power purchase agreements (PPA), enhanced-use leases (EUL), energy savings performance contracts (ESPC), and utilities energy service contracts (UESCs) as tools to achieve these objectives. The Army must invest in its installations and improve efficiencies in energy, water and waste for the benefit of our current and future missions.

NET ZERO: AN EVOLUTION

Net Zero Energy



A Net Zero Energy Installation produces as much energy on site as it uses, over the course of a year. To achieve this goal installations must first implement aggressive conservation and efficiency efforts while benchmarking energy consumption to identify further opportunities. The next step is to utilize waste energy or to "re-purpose" energy. Boiler stack exhaust, building exhausts or other thermal energy streams can all be utilized for a secondary purpose. Co-generation recovers heat from the electricity generation process. The balance of energy needs then are reduced and can be met by renewable energy projects. More information on Net Zero Energy Installations can be found in the DOE publication: "Net Zero Energy Military Installations: A Guide to Assessment and Planning," <http://www.nrel.gov/docs/fy10osti/48876.pdf>.

Net Zero Energy Pilot Installations

Fort Bliss, TX
Fort Carson, CO
Fort Detrick, MD
Fort Hunter Liggett, CA
Kwajalein Atol, RMI
Parks Reserve Forces TA, CA
Sierra Army Depot, CA
West Point, NY

Additionally, the Oregon Army National Guard will pilot a unique Net Zero Energy Initiative which includes all of their installations across the state.

Net Zero Water



A Net Zero Water Installation limits the use of potable fresh water and capture, repurpose or recharge an amount of water equal to or greater than the amount of water the installation consumes. The Net Zero Water strategy balances water availability and use to ensure sustainable water supply for years to come. This concept is of increasing importance since scarcity of clean potable water is quickly becoming a serious issue in many countries around the world. The continued draw-down of major aquifers results in significant problems for our future. Strategies such as harvesting rain water and recycling discharge water for reuse can reduce the need for municipal water, exported sewage or storm water. Desalination can be utilized to convert briny, brackish or salt water to fresh water so it is suitable for human consumption or irrigation.

To achieve a Net Zero Water Installation, efforts begin with conservation followed by efficiency in use and improved integrity of distribution systems. Water is re-purposed by utilizing grey water generated from sources such as showers, sinks, and laundries and by capturing precipitation and storm water runoff for on-site use. Wastewater can be treated and reclaimed for other uses or recharged into groundwater aquifers. Several Army

installations are already well down the path to reaching Net Zero Water goals.

Net Zero Water Pilot Installations

Aberdeen Proving Ground, MD
Camp Rilea, OR
Fort Bliss, TX
Fort Buchanan, PR
Fort Carson, CO
Fort Riley, KS
JB Lewis-McChord, WA
Tobyhanna Army Depot, PA

Net Zero Waste

The approach to creating a Net Zero Waste Installation is similar to creating a Net Zero Energy Installation. A net zero waste installation reduces, reuses, and recovers waste streams, converting them to resource values with zero solid waste to landfill over the course of a year. The components of Net Zero Waste start with reducing the amount of waste generated, re-purposing



waste, maximizing recycling of waste stream to reclaim recyclable and compostable materials, recovery to generate energy as a by-product of waste reduction, with disposal being non-existent.

Every day, more recycling strategies are developed moving beyond metals, paper and cardboard to include mattresses, glass, plastics, batteries, computer printers and motor oil. The best strategy is to consider the waste stream when purchasing items, reduce the volume of packaging, reuse as much as possible, and recycle the rest. A true cradle-to-cradle strategy considers the end state at the time the purchase decision is made. A Net Zero Waste strategy eliminates the need for landfills, protects human health, optimizes use of limited resources and keeps the environment clean.

Net Zero Waste Pilot Installations

Fort Bliss, TX
Fort Carson, CO
Fort Detrick, MD
Fort Hood, TX
Fort Hunter Liggett, CA
Fork Polk, LA
JB Lewis-McChord, WA
USAG Grafenwoehr, Germany

Net Zero Hierarchy

The Army Net Zero approach is comprised of five interrelated steps: **reduction, re-purpose, recycling**

and composting, energy recovery, and disposal. Each step is a link towards achieving Net Zero. Reduction includes maximizing energy efficiency in existing facilities, implementing water conservation practices, and eliminating generation of unnecessary waste. Re-purpose involves diverting energy, water or waste to a secondary purpose with limited processes. Recycling or composting involves management of the solid waste stream, development of closed loop systems to reclaim water, or cogeneration where two forms of energy (heat and electricity) are created from one source. Energy recovery can occur from converting unusable waste to energy, renewable energy or geothermal water sources. Disposal is the final step and last resort after the last drop of water, the last bit of thermal energy and all other waste mitigation strategies have been fully exercised.

Opportunity

The Net Zero vision is a holistic approach to addressing energy, water, and waste at Army installations. An approach that is a force multiplier enabling the Army to appropriately steward available resources, manage costs and provide our Soldiers, Families and Civilians with a sustainable future. In an era of persistent conflict, with a mission of stabilizing war-torn nations, a true stabilizing factor can be that of appropriate resource management. The Net Zero vision ensures that sustainable practices will be instilled and managed throughout the appropriate levels of the Army, while also maximizing operational capability, resource availability and well-being.

Net Zero Hierarchy



Office of the Assistant Secretary of the Army
(Installations, Energy & Environment)
110 Army Pentagon Room 3E464
Washington, D.C. 20310-0110
www.asaie.army.mil
11 July 2011